erosion, and as showing how similar (allowing for the difference in size) are the phenomena of the Himalayan and the Alpine glaciers. But I think that moulins, as a rule, are not likely to be very important agents in the formation of the rock-basins in which lakelets and tarns are often lodged. So far as my experience goes, the range over which the moulin-torrents can act is very restricted; for the crevasse, which gives the opportunity to the water, is generally formed very nearly at the same part of the glacier. Thus after the moulin has travelled for a very short distance down the glacier, a new crevasse opens out behind it and cuts off the torrent. I have frequently seen four or five dry shafts in advance of the working moulin. The lateral range also of the moulin must be small. Hence I think that the giant's-kettle (as is usually supposed) more accurately represents the ordinary product of a moulin. An excellent illustration is afforded by the well-known "glacier-garden" at Lucerne. I think, also, that the rock-basins, of which we speak, are more commonly found in situations where moulins would not be numerous or large, viz. in cwms and corries. It is, however, true that in certain undulating rock districts, as parts of Scandinavia and the Scotch Highlands, lakelets are common. The form of these, however, does not appear to bear much relation to the hollow produced by a moulin. So that I doubt whether we can regard a moulin as an agent of primary importance in the production of an ordinary rock-basin, though it may sometimes be a minor contributory. As I have more than once discussed the question of the probable cause of the formation of tarns as well as of large lake-basins, it is needless to repeat what has appeared in print.

T. G. Bonney.

23 Denning Road, N.W., November 13.

"The Zoological Record."

In your Notes for October 26, on p. 621, you follow the Editor of the *Zoological Record* in suggesting that, under the present financial conditions, palæontology should be removed from the volume issued by the Zoological Society, and provided for by the palæontologists themselves. Against such retrogression we desire to protest. "Everyone knows," as you say, "that an incomplete record is of very little use"; and how absurdly incomplete a record would be that took no account of palæontology! The objectors probably spring mostly from the ranks of systematic zoologists. We will deal with them on their own ground. The systematic position of *Limulus* has long been a vexed question, which no one can attempt to solve without consulting the work of Malcolm Laurie on the fossil Eurypterids. The classification of the Crinoids has troubled zoologists since the days of Johannes Müller; but neither he nor anyone ever dreamed of settling it without reference to palæontology. Students of recent Bryozoa will not be grateful to those who keep them in ignorance of J. W. Gregory's lately published work on the Bryozoa of the early Tertiary rocks. And so we might go on *ad infinitum*. Another argument that may affect the systematists is that if they reject all names of fossil genera and species from the record, they will have no means of knowing whether the new names they may wish to propose have been used before or not. It is even possible that some of them may unwittingly describe as new forms already described by some unknown palæontologist. It is hardly necessary to remind the morphologists, embryologists, and zoögeographers of the help that they constantly receive from the palæontologists; they, at least, will not wish to have the record made incomplete.

It is suggested that every branch of science should have a record, and that palæontologists should undertake the compilation of a separate one. This would as good as double the work, both for recorders and students. What we have said above shows that palæontology is not a separate science. Zoologists and palæontologists ought to be the same people, and when they have strength enough they are so, as the names of Cuvier, Owen, and Huxley sufficiently testify. The palæontological recorder would still have to work through the writings of the zoologists, while even the pure neontologists would have perpetually to refer to the palæontological record.

What is really wanted is to complete the *Zoological Record*, not to make it incomplete—to go forward, not backward. It is admitted that some of the recorders do tackle the palæontological literature. Why should not all? If a group is too large for one man, then give it to two, and if a second man cannot be got to work on half-pay, then double the pay.

To prevent the record becoming too big, make it merely an index, and cut out the abstracts, which are rarely correct. If more money is wanted, appeal to other societies which might naturally be supposed interested in the work. It is unfair that a single society should bear the burden of a work that is of value to all, and one can hardly suppose that it would refuse kindly offers of help. We believe, indeed, that the only reason why some of the recorders abstain for the present from the palæontological work is because they feel that part, at least, of the expense ought to be borne by the society more directly interested.

R. I. Pocock,
F. A. Bather,
B. B. Woodward.

British Museum (Nat. Hist.), October 30.

Recognition Marks.

A question in natural history has occurred to me, which, I think, might with advantage be discussed in your columns.

It is usual to account for the white tail of the rabbit (*Lepus cuniculus*) by saying that it is useful as a danger signal to others of the species. Wallace, in his "Darwinism," speaking of rabbits, says that "the white upturned tails of those in front serve as guides and signals to those more remote from home."

Now, there appear to me to be two objections to this theory. The first is that the tail of the hare (*Lepus timidus*) is also white, and is turned up in precisely the same manner when running; but it is obvious, from the habits of this animal, that in its case it would be quite unnecessaary for such a purpose.

And in the second place, if this were so, how could it have been produced by evolution? The object of the white tail is said to be to assist other rabbits to escape, not the possessor of the white tail itself. But the principle of evolution is the survival of the animal fittest to preserve its own life, not of the fittest to preserve the lives of others of the same species.

G. J. Macgillivray.

3 Belford Park, Edinburgh, November 6.

Mr. Macgillivray has failed to grasp the principle of natural selection when he thinks that it cannot produce a character useful to other animals of the same species. The action of natural selection is to preserve the *species*, as well as each individual separately; and, consequently, every character useful to the species as a whole would be preserved. This is obvious when we consider such characters as nest-building in birds, and milk-secretion in mammals, which do not benefit the individual possessors, but their offspring; and the same principle applies to every character which is mutually useful to individuals of the same species, as are what I have termed "recognition characters." Neither can I admit that the habits of the hare render the white upturned tail "quite unnecessary." The hare is a nocturnal feeder, and a mark which readily distinguishes a friend from an enemy, and enables the young during their short period of infancy to keep within sight of the mother, must be of considerable importance.

Alfred R. Wallace.

Correlation of Solar and Magnetic Phenomena.

In writing on this subject (Nature, vol. xlix. p. 30), to save space I omitted to refer to one other case of presumed connection. But as such omission might be misunderstood, may I here briefly allude to it? M. Trouvelot, on June 17, 1891, observed changes going on in connection with a luminous appearance near the western limb of the sun, such as he had not before seen. But the magnetic movement was in this case insignificant (see *The Observatory*, vol. xiv. pp. 326-328). The same reasoning as before may be applied. If the smaller magnetic motions do really directly depend on solar changes of so marked a character, how does it happen that many greater recorded magnetic movements remain without corresponding solar change having been seen? It is a very interesting, indeed critical point, but much more information is necessary to prove that such close connection really exists.

The appearance was seen by Trouvelot near the sun's limb. There is a significant sentence ending a letter from the Rev. Walter Sidgreaves, of Stonyhurst (*The Observatory*, vol. xiv. page 326), as follows:—"But there are no indications of magnetic disturbance accompanying the solar eruptions seen through the spectroscope. Even the brilliant display on the western limb, of the 10th [September 10, 1891], has left nothing that

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can be considered a record of itself on the magnetograph curves." WILLIAM ELLIS.

Greenwich, November 9.

[With regard to the case cited by Mr. Ellis, it is worth remark that at the time of Trouvelot's observation, the writer of our "Astronomical Notes" asked Mr. Whipple whether the eruption was accompanied by any anomalous magnetic movements. Mr. Whipple replied: "There was not the slightest magnetic disturbance on June 17, 1891, at the hour you mention, or for days before or since." The point was again raised at the beginning of last year, and to make assurance doubly sure, Mr. Whipple again referred to the Kew curves, but failed to find any trace of what could be termed a magnetic disturbance at the hour in question. (See NATURE, February 25, 1892.)—ED.]

THE NEW BIRD-PROTECTION BILL.

SENTIMENT is a beautiful thing in its way, and when that way happens to coincide with the way of common sense, the man must be a brute who defies it. But unluckily that does not always happen, as is testified by several instances that could but here shall not be cited, for they will come uncalled to the recollection of many of our readers, and indeed to some they are ever present. These need not to have the difference between a sound and an unsound sentiment pointed out. But there is also a sentiment that is perfectly sound at the start, and yet, chiefly through want of knowledge—we hesitate to call it ignorance, because that might imply blame—sooner or later begins to betray symptoms of running on the wrong track, when, if the brakes cannot be applied, it comes into violent collision with common sense. As the latter is the weightier mass the harm it gets from the impact is not often very serious, and the injuries received seldom cause more than delay, however annoying that may be; but the effect on the lighter body is apt to be destructive, and though in some cases it may be only repelled with slight damage, in others it may be shattered. In either event, seeing that it set out with good intentions, the result is to be regretted.

Of this kind of sentiment is that which actuates the extreme advocates of Bird Protection. Time was when the sickening slaughter of sea-fowl at their breeding-stations around our coast appealed alike to sentiment and to common sense—to say nothing of science—to interfere. First carried on for what was called "sport," but soon for the sake of mere lucre, the feathered denizens of our cliffs and beaches were shot down by the thousand, to do nobody any good but the "plume-trader." The Act of Parliament which received the Royal Assent in June 1869, and is always to be remembered in connection with the name of Mr. Christopher Sykes, was just in time to save from extinction the population of many a thronged resort which has always presented, and we trust always will present, a spectacle of delight to the large and increasing class of our fellow-countrymen who appreciate the harmonies of nature, even if the resorts on the English coast cannot compare with those

——where the Northern Ocean in vast whirls
Boils round the naked melancholy isles
Of sea-girt Thule, or the Atlantic surge
Pours in among the stormy Hebrides.

That Act may have had its shortcomings: few Acts are without them; but nobody can doubt it was effective to do good, and it was followed by other Acts, based on the same principle, and tending to relieve persecuted beings from persecution. An exception indeed must be made as regards one of them, but that one (which was commented upon at the time in these columns[1]) only serves to support the allegation in our introductory paragraph. In 1872 some enthusiasts followed the line of sentiment regardless of common sense, and succeeded in converting a well-considered and practical measure into one that was specious and useless. They had their reward, for in the next session their parliamentary leader obtained a Select Committee of the House of Commons to enquire into the subject, and the result of the investigation showed every reasonable person the baselessness of the points for which the extreme party had contended, while three years later the very Bill which they had mutilated and mauled passed through Parliament almost exactly in the form in which it had been originally introduced. The enthusiasts, however, had the satisfaction of stopping useful and much wanted legislation for four years in order to gratify their own gushing and unintelligent sentiment, while their Act, always a dead letter, was superseded by the Act of 1880 which consolidated all previous legislation. Still the spirit that moved the enthusiasts is not dead. In one way or another it shows itself every year—sometimes, though not often, it confines itself within the bounds of common sense, but of late it has become we may say rampant. None of the former Acts had done anything to stay the taking of birds' eggs. Indeed, birds' eggs had been, and that purposely, wholly left out of consideration, and this in the eyes of many excellent people has seemed to be a glaring defect—even a crime. Let us stop birdsnesting, say they, and the number of our birds will be indefinitely increased. Nightingales will multiply, Goldfinches will be as plentiful as Sparrows, and Skylarks will swarm. Little do these good people realise the state of things. Let us grant that in the immediate neighbourhood of towns and large villages, where birds are already at a disadvantage, boys will emerge, and successively rob nest after nest as it is built with an effect that may be called devastating. The case, however, is very different in the country at large. There the first species of those we have just named already enjoys a protection incidentally yet almost invariably conferred upon it by the law of trespass. We can believe almost any act of folly or stupidity on the part of some gamekeepers, and the widely-told story that one of that profession once declared that he destroyed Nightingales because their singing disturbed the nights' rest of his pheasants may have some foundation; but nearly all observers who have informed themselves by experience will agree that the part of England which Nightingales choose to occupy is generally as fully stocked with them as the place will hold. It is certain to those who watch that the number of Nightingales which return to this country with each returning spring is greater than that which can find room. Hence those ever-recurring contests of melody that we hear from rival cock birds on their first coming, to say nothing of the actual conflicts, often ending in the death of one of the combatants, that take place between the competitors. And it is only natural that it should be so. That if a Nightingale's nest be taken the same birds immediately build a second, and if need be a third, is a perfectly well-known fact, and it would be a very unlucky pair of Nightingales to have their nest robbed thrice in a season. At a very moderate computation the number of young Nightingales that must annually attain their full growth in this country doubles that of their parents, since from five to six are commonly reared in each nest; and, with a large allowance for casualties in youth, it is safe to calculate upon four of each brood having reached maturity when the time of emigration arrives. What happens during their absence from this country is of course beyond our ken, but the certainty with which migratory birds return to their home is now well-recognised; and it is not less certain that of this species more return to England in spring than are able to find accommodation in our woods, coppices, and shrubberies, as the conflicts just mentioned testify. Hence it would follow that were the taking of a Nightingale's egg made a capital offence, we should not have, one year with another, more Nightingales, though, to retain the number we have, it is impera-

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[1] NATURE, viii., p. 1, (May 1, 1873).

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